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09/909,364	07/19/2001	Tun Sein Tan	10004141-1	3266

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EXAMINER	
LI, SHI K	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/909,364	TAN ET AL.	
	Examiner	Art Unit	
	Shi K. Li	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-6,8,12-17,19 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-6,8,12-17,19 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell (U.S. Patent 4,723,315) in view of Tsunetsugu et al. (H. Tsunetsugu et al., "A Packaging Technique for an Optical 90°-Hybrid Balanced Receiver Using a Planar Lightwave Circuit", IEEE Transactions on Component, Packaging, and Manufacturing Technology – Part B, Vol. 19, No. 3, August 1996).

Regarding claim 1, Wetherell discloses in FIG. 8 an optical detection system comprising a first polarization beam splitter (PBS) for combining an input signal (SO) and a local oscillator (LO) signal, a polarization rotator R_{2x} coupled to a first output of the first PBS (PBS_1), a second PBS (PBS_{2x}), and first and second detector D^2x- and D^2x+. The first polarization beam splitter acts as a coupler for combining and splitting signals and is equivalent to the waveguide optical coupler of the instant claim. The difference between Wetherell and the claimed invention is that Wetherell does not teach a planar PBS. However, planar PBS is well known in the art. For example, Tsunetsugu et al. discloses in FIG. 1 a planar lightwave circuit including PBS. Planar PBS can be integrated with other optical components to reduce overall system size and increase system reliability. Tsunetsugu et al. also teaches to attach optical components to each other for achieving perfect coupling efficiency and reducing module size as illustrated in FIG. 5. One of

ordinary skill in the art would have been motivated to combine the teaching of Tsunetsugu et al. with the optical detection system of Wetherell because using planar PBS reduces overall system size and increases system reliability and attaching optical component to each other achieves perfect coupling efficiency and reducing module size. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use planar PBS and attach rotator to planar waveguide coupler, as taught by Tsunetsugu et al., in the optical detection system of Wetherell because using planar PBS reduces overall system size and increases system reliability.

Regarding claims 6, Wetherell includes in FIG. 8 frequency sensor for generating a signal indicating the difference of the input signal and the local oscillator for controlling the local oscillator.

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell and Tsunetsugu et al. as applied to claims 1 and 6 above, and further in view of Bouevitch et al. (U.S. Patent Application Pub. 2003/0198437 A1).

Wetherell and Tsunetsugu et al. have been discussed above in regard to claims 1 and 6. The difference between Wetherell and Tsunetsugu et al. and the claimed invention is that Wetherell and Tsunetsugu et al. do not teach to use walk-off crystal as polarization beam splitter. Bouevitch et al. teaches in paragraph [0032] that walk-off crystal is functionally equivalent to a polarization beam splitter. Where the claimed differences involve the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. See In re Ruff, 118, USPQ 343 (CCPA 1958). Therefore, it would have been

obvious to one of ordinary skill in the art at the time of the invention to use a walk-off crystal as polarization beam splitter in the modified optical detection system of Wetherell and Tsunetsugu et al.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell and Tsunetsugu et al. as applied to claims 1 and 6 above, and further in view of Kuwahara et al. (U.S. Patent 5,003,626).

Wetherell and Tsunetsugu et al. have been discussed above in regard to claims 1 and 6. Regarding claim 5, Wetherell further includes in FIG. 8, a second output from PBS_1, beam splitter PBS_{2y}, and third and fourth detector D^2y- and D^2y+. The difference between the modified optical detection system of Wetherell and Tsunetsugu et al. and the claimed invention is that Wetherell and Tsunetsugu et al. do not teach to use a single PBS for both outputs of the planar waveguide coupler. Kuwahara et al. teaches in FIG. 9 that a single PBS 135 can be used to split two light beams from two output of a coupler. One of ordinary skill in the art would have been motivated to combine the teaching of Kuwahara et al. with the modified optical detection system of Wetherell and Tsunetsugu et al. because using a single PBS is cost effective and reduces system size. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a single PBS for splitting beams from the two output of the planar waveguide couple, as taught by Kuwahara et al., in the modified optical detection system of Wetherell and Tsunetsugu et al. because using a single PBS is cost effective and reduces system size.

5. Claims 8 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell and Tsunetsugu et al. as applied to claims 1 and 6 above, and further in view of.

Yoshida et al. (S. Yoshida et al., "High Resolution Optical Spectrum Analysis by Coherent Detection with Multi-Electrode DBR-LD's as Local Oscillators", IEEE 1994).

Wetherell and Tsunetsugu et al. have been discussed above in regard to claims 1 and 6. The difference between Wetherell and Tsunetsugu et al. and the claimed invention is that Wetherell and Tsunetsugu et al. do not teach to use the modified optical detection system as spectrum analysis. Yoshida et al. teaches in FIG. 1 to use a coherent detection system for optical spectrum analysis. One of ordinary skill in the art would have been motivated to combine the teaching of Yoshida et al. with the modified optical detection system of Wetherell and Tsunetsugu et al. because such approach provides large dynamic range and high frequency resolution. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the modified optical detection system of Wetherell and Tsunetsugu et al., as taught by Yoshida et al., because such approach provides large dynamic range and high frequency resolution.

Regarding claim 16, Tsunetsugu et al. teaches in FIG. 2 to use GRIN rod lenses between beam splitter and photoreceivers. One of ordinary skill in the art would have been motivated to combine the teaching of Tsunetsugu et al. with the modified optical spectrum analysis system of Wetherell, Tsunetsugu et al. and Yoshida et al. because lenses provides perfect coupling efficiency. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include lenses between beam splitter and detectors, as taught by Tsunetsugu et al., in the modified optical spectrum analysis system of Wetherell, Tsunetsugu et al. and Yoshida et al. because lenses provides perfect coupling efficiency.

Regarding claim 17, Yoshida et al. teaches in FIG. 1 to use a tunable laser for generating swept local oscillator signal.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell, Tsunetsugu et al. and Yoshida et al. as applied to claims 8 and 16-17 above, and further in view of Bouevitch et al. (U.S. Patent Application Pub. 2003/0198437 A1).

Wetherell, Tsunetsugu et al. and Yoshida et al. have been discussed above in regard to claims 8 and 16-17. The difference between Wetherell, Tsunetsugu et al. and Yoshida et al. and the claimed invention is that Wetherell, Tsunetsugu et al. and Yoshida et al. do not teach to use walk-off crystal as polarization beam splitter. Bouevitch et al. teaches in paragraph [0032] that walk-off crystal is functionally equivalent to a polarization beam splitter. Where the claimed differences involve the substitution of interchangeable or replaceable equivalents and the reason for the selection of one equivalent for another was not to solve an existent problem, such substitution has been judicially determined to have been obvious. See In re Ruff, 118, USPQ 343 (CCPA 1958). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a walk-off crystal as polarization beam splitter in the modified optical detection system of Wetherell, Tsunetsugu et al. and Yoshida et al.

7. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell, Tsunetsugu et al. and Yoshida et al. as applied to claims 8 and 16-17 above, and further in view of Kuwahara et al. (U.S. Patent 5,003,626).

Wetherell, Tsunetsugu et al. and Yoshida et al. have been discussed above in regard to claims 8 and 16-17. Regarding claim 13, Wetherell further includes in FIG. 8, a second output from PBS_1, beam splitter PBS_{2y}, and third and fourth detector D^2y- and D^2y+. The difference

between the modified optical detection system of Wetherell, Tsunetsugu et al. and Yoshida et al. and the claimed invention is that Wetherell, Tsunetsugu et al. and Yoshida et al. do not teach to use a single PBS for both outputs of the planar waveguide coupler. Kuwahara et al. teaches in FIG. 9 that a single PBS 135 can be used to split two light beams from two output of a coupler. One of ordinary skill in the art would have been motivated to combine the teaching of Kuwahara et al. with the modified optical spectrum analysis system of Wetherell, Tsunetsugu et al. and Yoshida et al. because using a single PBS is cost effective and reduces system size. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a single PBS for splitting beams from the two output of the planar waveguide couple, as taught by Kuwahara et al., in the modified optical spectrum analysis system of Wetherell, Tsunetsugu et al. and Yoshida et al. because using a single PBS is cost effective and reduces system size.

Regarding claim 14, Wetherell includes in FIG. 8 frequency sensor for generating a signal indicating the difference of the input signal and the local oscillator for controlling the local oscillator.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell, Tsunetsugu et al., Yoshida et al. and Kuwahara et al. as applied to claims 13-14 above, and further in view of Araki et al. (U.S. Patent 6,640,042 B2).

Wetherell, Tsunetsugu et al., Yoshida et al. and Kuwahara et al. have been discussed above in regard to claims 13-14. The difference between Wetherell, Tsunetsugu et al., Yoshida et al. and Kuwahara et al. and the claimed invention is that Wetherell, Tsunetsugu et al., Yoshida et al. and Kuwahara et al. do not teach a fiber holder. Araki et al. teaches in FIG. 19 a fiber

holder. One of ordinary skill would have been motivated to combine the teaching of Araki et al. with the modified heterodyne detection system of Wetherell, Tsunetsugu et al., Yoshida et al. and Kuwahara et al. because the fiber holder of Araki et al. secures a number of fibers at predetermined intervals while maintaining high density (see col. 2, lines 64-65). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a fiber holder, as taught by Araki et al., in the modified heterodyne detection system of Wetherell, Tsunetsugu et al., Yoshida et al. and Kuwahara et al. because the fiber holder of Araki et al. secures a number of fibers at predetermined intervals while maintaining high density.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell, Tsunetsugu et al. and Yoshida as applied to claims 8 and 16-17 above, and further in view of Sorin et al. (U.S. Patent 6,259,529 B1).

Wetherell, Tsunetsugu et al. and Yoshida have been discussed above in regard to claims 8 and 16-17. The difference between Wetherell, Tsunetsugu et al. and Yoshida and the claimed invention is that Wetherell, Tsunetsugu et al. and Yoshida et al. do not teach an attenuator. Sorin et al. teaches in FIG. 13 to include intensity noise reducer 1376 to attenuate noise. One of ordinary skill in the art would have been motivated to combine the teaching of Sorin et al. with the modified optical system of Wetherell, Tsunetsugu et al. and Yoshida et al. because intensity noise reducer reduces intensity noise and improve signal to noise ratio and dynamic range of the optical system (see col. 14, lines 54-59 of Sorin et al.). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include intensity a noise reducer, as taught by Sorin et al., in the modified optical system of Wetherell, Tsunetsugu et al. and

Yoshida et al. because intensity noise reducer reduces intensity noise and improve signal to noise ratio and dynamic range of the optical system.

10. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wetherell, Tsunetsugu et al. and Yoshida et al. as applied to claims 8 and 16-17 above, and further in view of Lange et al. (U.S. Patent 6,748,179 B2).

Wetherell, Tsunetsugu et al. and Yoshida et al. have been discussed above in regard to claims 8 and 16-17. The difference between Wetherell, Tsunetsugu et al. and Yoshida et al. and the claimed invention is that Wetherell, Tsunetsugu et al. and Yoshida et al. do not teach to use filter for attenuating input signal. Lange et al. teaches in FIG. 5 to use a tunable filter to monitor or analyze spectrum for each channel for a WDM system. One of ordinary skill in the art would have been motivated to combine the teaching of Lange et al. with the modified spectrum analysis system of Wetherell, Tsunetsugu et al. and Yoshida et al. for WDM applications. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a tunable filter for attenuate unwanted channels, as taught by Lange et al., in the modified spectrum analysis system of Wetherell, Tsunetsugu et al. and Yoshida et al. because it allows the system to be used for WDM applications.

Response to Arguments

11. Applicant's arguments filed 17 August 2005 have been fully considered but they are not persuasive.

The Applicant argues that Wetherell does not depict optical elements attached to each other and have found no teaching or suggestion in Wetherell that the optical coupler should be attached to the polarization rotators or that the polarization rotators should be attached to the

polarizing beam splitters. However, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Furthermore, reference Tsunetsugu is cited for teaching the difference between Wetherell and the claimed invention. Tsunetsugu et al. also teaches to attach optical components to each other for achieving perfect coupling efficiency and reducing module size as illustrated in FIG. 5. One of ordinary skill in the art would have been motivated to combine the teaching of Tsunetsugu et al. with the optical detection system of Wetherell because using planar PBS reduces overall system size and increases system reliability and attaching optical component to each other achieves perfect coupling efficiency and reducing module size. Together, Wetherell and Tsunetsugu et al. teach all the limitations of claim 1.

The Applicant argues that Tsunetsugu teaches away from the claim invention. The Examiner disagrees. In response to applicant's argument that the planar waveguide optical coupler and the two planar waveguide PBSs of Tsunetsugu are guided optical elements that cannot both be attached to a polarization rotator without some collimating optics, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The Applicant then argues that Tsunetsugu teaches that polarization control is achieved through "thermo-optic phase shifters" and that the use of "thermo-optic phase shifters" teaches

away from the claimed invention. The Examiner disagrees. Even through Tsunetsugu does not teach a polarization rotator, it does not criticize, discredit, or otherwise discourage the use of polarization rotator. Therefore, Tsunetsugu does not teach away the claimed invention. See In re Fulton, 73 USPQ2d 1141 (CA FC 2004). Furthermore, Wetherell teaches the polarization rotator and the Tsunetsugu reference is relied upon for teaching planar PBS and attaching optical components for achieving perfect coupling.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

skl
18 October 2005

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